

REMARKS

This amendment is in response to the Office Action dated April 7, 2006. Reconsideration of this application is respectfully requested in view of the foregoing amendment and the remarks that follow.

STATUS OF CLAIMS

Claims 1-20 are pending.

Claim 13 is objected to because it is a substantial duplicate of claim 11.

Claims 1, 3, 4, 14, and 18-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al) in view of U.S. Patent 6,738,790 A1 (Klein et al).

Claims 2 and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al), U.S. Patent 6,738,790 A1 (Klein et al) and further in view of U.S. Patent 6,122,640 (Pereira).

Claims 5 and 8-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al), U.S. Patent 6,738,790 A1 (Klein et al) and further in view of U.S. Patent 6,457,014 (Parker).

Claims 6, 11, and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al), U.S. Patent 6,738,790 A1 (Klein et al), U.S. Patent 6,457,014 (Parker), and further in view of U.S. Patent 6,122,640 (Pereira).

Claims 7, 12, and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al), U.S. Patent 6,738,790 A1 (Klein et al), U.S. Patent 6,457,014 (Parker), and further in view of U.S. Patent 6,163,783 (Hintz et al).

Claim 17 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al), U.S. Patent 6,738,790 A1 (Klein et al), U.S. Patent 6,457,014 (Parker), U.S. Patent 6,122,640 (Pereira), and further in view of U.S. Patent 6,163,783 (Hintz et al).

OVERVIEW OF CLAIMED INVENTION

The present invention provides for a method for reorganizing a table space in a database. An exemplary embodiment comprises the steps of: (a) blocking write access to data being reorganized; (b) identifying LOB table spaces that are related to the table space being reorganized; (c) concurrently creating a shadow data set for each of the LOB table spaces and a shadow data set for the table space and associated indexes; (d) loading rows into shadow data sets, and for each row loaded, reading LOBs from each of LOB table spaces relating to a loaded row and writing the read LOB to a corresponding shadow data set; (e) switching original data set with shadow data sets; and (f) allowing write operations related to data being organized to proceed.

The present invention also provides for a system to reorganize a table space in a database. In an exemplary embodiment, the system comprises: (a) an identifier to identify LOB table spaces that are related to the table space being reorganized; (b) a shadow data set creator to concurrently create a shadow data set for each of the LOB table spaces and a shadow data set for the table space and associated indexes; (c) a shadow data set loader to load rows into shadow data sets, and for each row loaded, reading LOBs from each of the LOB table spaces relating to a

loaded row and writing said read LOB to a corresponding shadow data set; and (d) a data switcher to switch the original data set with the shadow data sets.

Hence, the present invention's system and method reorganizes a table space (that contains a LOB base table) and related table spaces (which contain the LOB auxiliary tables). A major advantage of the present invention is that users of the REORG utility do not have to have knowledge of the related LOB table spaces. The LOB table space relationships are determined by the REORG utility. This allows for optimum performance because all of the table spaces, related to a LOB, would be reorganized at the same time. In addition, the LOB REORG would free unused space, as is done in a normal REORG, and the data would be loaded in the correct sequence.

In the Claims

OBJECTIONS

Claim 13 has been amended to include a proper dependency on claim 12. This amendment should overcome the objection as noted.

REJECTIONS UNDER 35 U.S.C. § 103

Claims 1, 3, 4, 14, and 18-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al) in view of U.S. Patent 6,738,790 A1 (Klein et al).

Marshall et al (2003/0135478), hereafter Marshall, appears to provide for an on-line reorganization method for an existing database, which involves finalizing a shadow database with updates when an existing database is taken off-line, and placing the finalized shadow database on-line. More specifically, Marshall provides for a system and method for online reorganization of an existing database that occurs while read and update activity of the existing database continues. Marshall's system and method comprise unloading the existing database, reloading the existing database directly to a shadow database, building shadow database indexes, creating a first intermediary image copy of the existing database, analyzing the existing database, capturing updates for the existing database, applying the captured updates to the shadow database, taking the existing database offline, finalizing the shadow database with any remaining updates, creating a final image copy, comparing the existing database and the finalized shadow database, and placing the finalized shadow database online.

Marshall teaches many steps for reorganizing an existing database and has put forth an improvement to include updates as they happen during the reorganizing effort. While this method teaches basic shadow database reorganizing methods, it does not contemplate, nor suggest, reorganization of associated LOB table spaces as is claimed by the present invention. Each of the independent claims includes the steps necessary to reorganize related table spaces; Marshall provides no details, nor any suggestion or motivation as to this concept or any related steps to produce the claimed elements of the present invention. A closer reading of Marshall, suggests that Marshall is concerned with the online reorganizing of the entire database and therefore provides little insight as to how specific LOB table spaces and their associated table spaces would be handled during reorganization. Absent this teaching, it is believed that the Marshall reference does not provide for the claimed features.

The examiner has added the Klein et al reference (USP 6,738,790), hereafter Klein, in an attempt to fill in for Marshall's lack of teachings of the recognition of related LOB table spaces during reorganization.

Klein provides for a large objects accessing method for a client server database system, which involves storing a locator including an object identifier and version number for an object in a table if a parameter is set to a value or else storing data for a subset of the object. More specifically, Klein provides for a method and system for accessing a large object (LOB) that belongs to a cell in a table. An index is built on a column in which the cell resides. The index has a key that includes a LOB identifier. A database server receives from a client a request to access the LOB. The server uses a LOB identifier value for the LOB to traverse the index to locate an index entry for the LOB. The server then follows address information contained in the index entry to a storage containing at least a portion of the LOB and accesses the portion of the LOB as specified in the request. Klein also discloses a method and system for tracking storage for data items are also disclosed. Within an index that is built to access the data items are stored both index entries for locating blocks that store current versions of the data items, and index entries for locating blocks that store non-current versions of the data items.

With respect to the claimed feature of "recognizing related LOB table spaces during reorganizing", the examiner has pointed to col. 2, line 64 through col. 3, line 3, where it states "According to another aspect of the invention, a method is provided for accessing large objects (LOBs) that belong to a column of a table. The method includes building an index on the column, wherein the index includes index entries that contain pointers to blocks containing LOB data associated with the LOBs. Then, a locator is stored for each LOB in the table, wherein each locator includes a LOB identifier and a version number for a corresponding LOB. Finally, a

plurality of pointers is stored within at least one cell in the column, where each pointer of the plurality of pointers points to a LOB chunk of a LOB that belongs to the cell.”

A closer reading of this section appears to only reveal a method for “accessing large objects (LOBs) that belong to a column of a table”. Nowhere in the citation does the step of recognizing related LOB table spaces during reorganizing appear. In fact, steps for reorganizing the table spaces does not appear to be a concept discussed within the reference.

Marshall does not appear to recognize associated LOB table spaces during reorganization. Klein does not appear to discuss recognizing associated LOB table spaces during reorganization. Therefore, the combination of the two references cannot provide for these features or variances thereof in any of the claims of the present application, nor would it have been obvious.

Claims 2 and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al), U.S. Patent 6,738,790 A1 (Klein et al) and further in view of U.S. Patent 6,122,640 (Pereira).

Pereira teaches reorganization of database tables is performed while the tables being reorganized are available for normal OLTP activity. A trigger is setup to record OLTP activity on a source table to be reorganized. The source table is momentarily locked to establish an SCN checkpoint and determine the location of data blocks allocated for the source table. A copy of the table is created (new table) and blocks untouched/modified since the timestamp are unloaded from the source table and inserted into the new table. Transactions occurring since the timestamp are performed on the new table until no more transactions since the timestamp remain in the trigger record. The new table is switched with the source table (renamed as the source table), and the original source table is dropped.

The examiner has added Pereira in combination with Marshall and Klein in an effort to show blocking and unblocking write access during the reorganization process. Two problems exist with this combination. First, if one assumes that Pereira stops the write process during reorganization, then it teaches directly away from the improvement sought by Marshall – “A system and method for online reorganization of an existing database that occurs while read and update activity of the existing database continues.” (underlined for emphasis) and therefore would not be a proper combination of references. Second, Pereira only creates a “momentary lock”, but continues “normal OLTP” during the reorganization process. This is not equivalent to the claimed “blocking before reorganization and allowing write operations after reorganizing” and is therefore does not provide the claimed features.

Claims 5 and 8-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al), U.S. Patent 6,738,790 A1 (Klein et al) and further in view of U.S. Patent 6,457,014 (Parker).

Parker teaches a system for extracting index key data fields. Parker’s system includes a definition interrogator that extracts index definitions and column definitions from a database. Parker’s system also includes a code generator that is connected to the definition interrogator. The code generator builds computer code for extracting index key data fields based upon the index definitions and the column definitions. A table analyzer is connected to the code generator and uses the computer code to extract index data from a data table.

The examiner has added Parker to satisfy the missing elements of the claims directed to loading of rows into allocated shadow sets and extracting index keys for each loaded row, said data sets allocated for each table space and associated indexes. However, a closer reading of the col. 5, lines 32-34 section of Parker pointed to by the examiner, only appears to reveal an

analysis of a row of a table to determine the location of the index key column data. No loading function appears, shadow set environment, or allocation for each table space and associated indexes. As such, the combination does not provide for the claimed features, nor renders them obvious.

Claims 6, 11, and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al), U.S. Patent 6,738,790 A1 (Klein et al), U.S. Patent 6,457,014 (Parker), and further in view of U.S. Patent 6,122,640 (Pereira).

Rejections for claims 6, 11, and 13 are addressed in above arguments and are equally applicable here.

Claims 7, 12, and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al), U.S. Patent 6,738,790 A1 (Klein et al), U.S. Patent 6,457,014 (Parker), and further in view of U.S. Patent 6,163,783 (Hintz et al).

Hintz teaches a single phase CHECK DATA operation for DB2 entails creating a special SORT record for each primary key and each foreign key, collating the special SORT records in a particular way to group together the SORT records for each primary key, and performing diagnostic operations on the sorted records.

The examiner has added Hintz to teach the unloading and sorting of rows from original table spaces. However, a closer reading of Hintz (col. 3, lines 14-24) only reveals a reorganization and extraction of primary and foreign key indexes and sorting based on these. The claimed feature “unloading and sorting of rows from original table spaces” does not appear to be explicitly nor implicitly taught in this section. As such, the combination does not provide for the claimed features, nor renders them obvious.

Claim 17 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication 2003/0135478 A1 (Marshall et al), U.S. Patent 6,738,790 A1 (Klein et al), U.S. Patent 6,457,014 (Parker), U.S. Patent 6,122,640 (Pereira), and further in view of U.S. Patent 6,163,783 (Hintz et al).

Rejections for claim 17 are addressed in above arguments and are equally applicable here.

SUMMARY

As has been detailed above, none of the references, cited or applied, provide for the specific claimed details of applicants' presently claimed invention individually, or in combination, nor render them obvious. It is believed that this case is in condition for allowance and reconsideration thereof and early issuance is respectfully requested.

This amendment is being filed with a request for extension of time. The Commissioner is hereby authorized to charge the extension fee, as well as any deficiencies in the fees provided to Deposit Account No. 12-0010.

If it is felt that an interview would expedite prosecution of this application, please do not hesitate to contact applicants' representative at the below number.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "R. W. Lacasse", with a stylized circular flourish at the beginning.

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